



UNITED STATES PATENT AND TRADEMARK OFFICE

m-S

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/427,639	10/27/1999	SHUNPEI YAMAZAKI	0756-2053	3558

22204 7590 10/05/2006

NIXON PEABODY, LLP
401 9TH STREET, NW
SUITE 900
WASHINGTON, DC 20004-2128

EXAMINER

KUMAR, SRILAKSHMI K

ART UNIT	PAPER NUMBER
----------	--------------

2629

DATE MAILED: 10/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/427,639

Applicant(s)

YAMAZAKI ET AL.

Examiner

Srilakshmi K. Kumar

Art Unit

2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>10/29/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The following office action is in response to the amendment filed on June 12, 2006. Claims 1-45 are pending. Claims 1, 3, 6, 9, 32 and 33 are amended.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. **Claims 1-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al. (U.S. Patent No. 4,090,219) Ohwada et al. (U.S. Patent No. 4,750,813), and Hata et al. (U.S. Patent No. 5,439,837).

With reference to **claims 1-4, 6, 7, and 9**, APA teaches a driving method for a liquid crystal display, wherein a red, a green, or a blue black light turns on corresponding to display of the red, green, or blue image, said method comprising the step of: compressing original video

Art Unit: 2629

signals by $1/(3n)$ times in a time axis direction by a n-speed field sequential color signal generation circuit, in the Applicant discussion of the conventional art of a field sequential driving method in which one image frame is divided into three subframes and each one of the red, green and blue backlights are turned on for one-third frame duration to display an image corresponding to that color for one-third frame duration. APA also teaches that the red, green and blue LEDs are turned on successively during their corresponding LED turn-on periods (T_r , T_g , T_b) (see page 2, line 11-page 3, line 21).

While teaching all above, the admitted prior art fails to discuss displaying each of the red, green, and blue images in each of the subframes and writing a video signal for one of the red image, the green image and the blue image. Even though it is taught that the display device of the admitted prior art is an AM-LCD there is no discussion of the specific components of the LCD panel as claimed.

Ernstoff et al. teaches a liquid crystal field sequential color display in which one image frame comprises 2 fields, each of which comprises writing video signal for a red image, a green image, and a blue image (see column 7, line 68-column 8, line 34). With reference to **claims 2, 4, and 7** Ernstoff et al. teaches that the frame comprises 2 fields, however it would be possible to have 3 fields in each frame by shortening the duration of each field thereby further reducing the amount of flicker seen by the observer. With further reference to **claims 3 and 6**, Ernstoff et al. teaches that three light sources (204, 206, 208) representing each of the primary colors are operated one at a time, in a repetitive sequence by switch (216), at a rate such that the complete 3-color sequence is completed more rapidly than the flicker fusion frequency. A synchronizing

Art Unit: 2629

means (222) controls switching means (216) supplying power to the light sources in the manner indicated in Fig. 10 (see column 7, lines 40-58).

Ohwada et al. teaches an AM-LCD wherein the display comprises a glass substrate, which is known in the art to have an insulating surface, wherein the active matrix circuit (1) comprising a plurality of first thin film transistors provided over said substrate; a driver circuit (4, 5) comprising a plurality of second thin film transistors provided over said substrate for driving the active matrix circuit, and a n-speed field sequential color signal generation circuit (8) comprises a third thin film transistor over said substrate (see column 3, lines 15-20). While teaching the usage of the TFT circuits as claimed, there fails to be any discussion towards the TFT's having a channel region comprising crystallized silicon.

Hata et al. teaches an AM-LCD composed of thin-film transistors wherein the TFT has a channel region comprising crystallized silicon (see column 1, lines 8-30), wherein the TFT has a low concentration impurity region (10, 20) adjacent to the channel forming region (12b) (see column 6, lines 51-56, column 7, lines 30-48).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to allow displaying RGB images in each subframe as taught by Ernstoff et al. along with the drive method of the admitted prior art in order to provide an AM-LCD having high resolution and high brightness. Further it would have been obvious to one having ordinary skill in the art to allow the AM-LCD as taught by the combination of the admitted prior art and Ernstoff et al. to be constructed similar to that which is taught by Ohwada et al. and Hata et al. in order to thereby allow all or a majority of the circuitry to be composed as an integrated circuit which requires less space in order and to provide stabilization of characteristics of the transistor

Art Unit: 2629

in order to provide the user with a liquid crystal field sequential display that has improved display quality and a reduced amount of flicker observed by the user.

With reference to **claims 5 and 8**, while the references teach all that is required as explained above, none of the reference teach that the liquid crystal display is a ferroelectric liquid crystal display device.

However, the examiner takes Official Notice that the usage of a ferroelectric liquid crystal display device is obvious and well known to those skilled in the art, wherein a ferroelectric type liquid crystal is well known type to be used in display device.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use a ferroelectric liquid crystal display, or any other type of liquid crystal display; in order to provide a driving method which could be carried in order to provided better display quality.

4. **Claims 10-31** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al., Ohwada et al., and Hata et al. as applied to **claims 3 and 9** above, and further in view of McDowall et al. (U.S. Patent No. 5,528,262).

With reference to the claims neither the admittance of prior art, Ernstoff et al., nor Ohwada et al. teach the particular type of device that contain the liquid crystal device.

McDowall et al. teaches, with specific reference to **claims 10 and 21**, that construction of a color display with particular advantages for head mounted and head coupled displays (see abstract). However, with reference to **claims 11-20 and 22-31**, McDowall et al. further states

Art Unit: 2629

field sequential displays are of great interest in situations that require small color displays (see column 2, lines 33-44).

Therefore it would have been obvious to one having ordinary skill in the art to allow for the liquid crystal display device as taught by the admitted prior art, Ernstoff et al., Ohwada et al., and Hata et al. having the advantages as explained above, including a reduction in noticeable flickering, to be constructed in a plurality of different devices to thereby increase the marketability of the product.

5. **Claims 32-34** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al., Ohwada et al., Hata et al., and Konno et al (U.S. patent No. (5,327,229).

With reference to **claims 32-34** APA teaches a driving method for a liquid crystal display, wherein a red, a green, or a blue back light turns on corresponding to display of the red, green, or blue image, said method comprising the step of: compressing original video signals by $1/(3n)$ times in a time axis direction by a n-speed field sequential color signal generation circuit, in the Applicant discussion of the conventional art of a field sequential driving method in which one image frame is divided into three subframes and each one of the red, green and blue backlights are turned on for one-third frame duration to display an image corresponding to that color for one-third frame duration. APA also teaches an original red, green, and blue video signal entered from outside to one-third the time axis direction, and that the red, green and blue LEDs are turned on successively during their corresponding LED turn-on periods (T_r , T_g , T_b) (see page 2, line 11-page 3, line 21); further, admitted prior art teaches wherein n subframes include

Art Unit: 2629

backlight turn-on period and backlight turn off period as shown in Fig. 22 and page. 2, line 11- page 3, line 21).

The admitted prior art fails to discuss displaying each of the red, green, and blue images in each of the subframes. Even though it is taught that the display device of the conventional art is an AM-LCD there is no discussion of the specific components of the LCD panel as claimed.

Ernstoff et al. teaches a liquid crystal field sequential color display in which one image frame comprises 2 fields, each of which comprises a red image, a green image, and a blue image (see column 7, line 68-column 8, line 34). Ernstoff et al. teaches that the frame comprises 2 fields, however it would be possible to have 3 fields in each frame by shortening the duration of each field thereby further reducing the amount of flicker seen by the observer. Ernstoff et al. also teaches that three light sources (204, 206, 208) representing each of the primary colors are operated one at a time, in a repetitive sequence by switch (216), at a rate such that the complete 3-color sequence is completed more rapidly than the flicker fusion frequency. A synchronizing means (222) controls switching means (216) supplying power to the light sources in the manner indicated in Fig. 10 (see column 7, lines 40-58).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to allow displaying RGB images in each subframe as taught by Ernstoff et al. along with the drive method of the admitted prior art in order to provide an AM-LCD having high resolution and high brightness.

Ohwada et al. teaches an AM-LCD wherein the display comprises a glass substrate, which is known in the art to have an insulating surface, wherein the active matrix circuit (1) comprising a plurality of first thin film transistors provided over said substrate; a driver circuit

Art Unit: 2629

(4, 5) comprising a plurality of second thin film transistors provided over said substrate for driving the active matrix circuit, and a n-speed field sequential color signal generation circuit (8) comprises a third thin film transistor over said substrate (see column 3, lines 15-20). While teaching the usage of the TFT circuits as claimed, there fails to be any discussion towards the TFT's having a channel region comprising crystallized silicon.

Hata et al. teaches an AM-LCD composed of thin-film transistors wherein the TFT has a channel region comprising crystallized silicon (see column 1, lines 8-30), wherein the TFT has a low concentration impurity region (10, 20) adjacent to the channel forming region (12b) (see column 6, lines 51-56, column 7, lines 30-48).

Konno et al. teaches the usage of a photo-conductive layer (23) in which the impedance thereof is fairly constant by controlling the light absorbance characteristics of the dielectric mirror (24) as such that a leakage of light is reduced and thereby providing a uniform amount of light received by the display.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to allow displaying RGB images in each subframe as taught by Ernstoff et al. along with the drive method of the admitted prior art in order to provide an AM-LCD having high resolution and high brightness. Further it would have been obvious to one having ordinary skill in the art to allow the AM-LCD as taught by the admitted prior art and Ernstoff et al. to be constructed similar to that which is taught by Ohwada et al., Hata et al., Konno et al. in order to thereby allow all or a majority of the circuitry to be composed as an integrated circuit which requires less space, to provide stabilization of characteristics of the transistor, and to have a fairly

Art Unit: 2629

constant impedance in order to provide the user with a liquid crystal field sequential display that has improved display quality and a reduced amount of flicker observed by the user.

6. **Claims 35-45** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al., Ohwada et al., Hata et al., and Konno et al. as applied to **claims 32-34** above, and further in view of McDowall et al. (U.S. Patent No. 5,528,262).

With reference to the claims neither the admittance of prior art, Ernstoff et al., nor Ohwada et al. teach the particular type of device that contain the liquid crystal device.

McDowall et al. teaches, with specific reference to **claim 35**, that construction of a color display with particular advantages for head mounted and head coupled displays (see abstract. However, with reference to **claims 36-45**, McDowall et al. further states field sequential displays are of great interest in situations that require small color displays (see column 2, lines 33-44).

Therefore it would have been obvious to allow for the liquid crystal display device with a reduction in noticeable flickering to be constructed in a plurality of different devices to thereby increase the marketability of the product.

Response to Arguments

Applicant's arguments filed June 12, 2006 have been fully considered but they are not persuasive.

Applicant argues on page 13, lines 8-14, where the prior art of Ernstoff does not disclose where the red, green and blue light sources do not have a turn on and turn off period.

Applicant's admitted prior art in Fig. 22, and page 3, lines 9-21, clearly teaches where there is a

Art Unit: 2629

turn on period and turn off period, where the red led is on, then off, green is on then off, blue is on, then off, thus disclosing the limitation of the light turn on period and turn off period.

Therefore, the combination of Applicant's admitted prior art in view of Ernstoff, Ohwada, Hata, and Konno clearly teach the limitations set forth in the instant application. Thus, the rejection is maintained and made FINAL

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Srilakshmi K. Kumar whose telephone number is 571 272 7769. The examiner can normally be reached on 9:00 am to 5:30 pm.

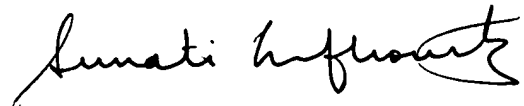
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on 571 272 3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2629

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Srilakshmi K. Kumar
Examiner
Art Unit 2629

SKK
September 30, 2006

A handwritten signature in black ink, appearing to read "Sumati Lefkowitz", with a stylized flourish at the end.

SUMATI LEFKOWITZ
SUPERVISORY PATENT EXAMINER